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INFORMATION CIRCULAR

GEOPHYSICAL ABSTRACTS

NO. XXXVII

BY

FREDERICK W. LEE

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INFORMATION CIRCULAR
DEPARTMENT OF COMMERCE - BUREAU OF MINES

GEOPHYSICAL ABSTRACTS[1]

No. 37

Compiled by Frederick W. Lee[2]

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1. GRAVITATIONAL METHODS

(749) LA PROSPECTION GRAVIMÉTRIQUE DU SOUS-SOL

(GRAVIMETRICAL PROSPECTING OF THE SUBSOIL)

By M. H. Galburn

Annales des Mines, Paris, vol. 20, No. 11, 1931, pp. 335-424.

In the first part of this article the author gives a mathematical derivation of formulas concerning gravity and the torsion balance, gradient of gravity, and the direction of the intensity of gravity at a point near the surface of the earth. Principles of gravimetrical prospecting, including correction for topography, are discussed.

The second part deals with the examination of the results of torsion balance measurements obtained at two stations (region of Oubian and Liege). Two maps showing the vector gradients and the isogams are added. Their interpretation forms the last part of the article.--W. Ayvazoglou.

(750) L'ANTICLINALE GRAVIMETRICO-PETROLIFERA DI FONTEVIVO

(GRAVIMETRICAL PETROLIFEROUS ANTICLINE AT FONTEVIVO)

By A. Belluigi

Extract from the Bolletin del Comitato Nazionale, Italiano per la Geodesia e la Geofisica. Second series, vol. 2, No. 2, Feb., 1932, pp. 1-3.

The note concerns gravimetrical exploration of the anticline in the region of Fontevivo, known for its petroliferous structure. Results of the investigation, accompanied by two maps, are given.--W. Ayvazoglou.

(751) THEORETICAL BASIS OF ISOSTASY

By W. D. Lambert

American Journal of Science, New Haven, vol. 21, No. 123, 1931, pp. 345-349.

The validity of observational proof of isostasy has been questioned on theoretical grounds by Hopfner, but his presentation of the mathematical theory is not generally accepted by geodesists. The author quotes Prey's views in support of the idea that the earth is isostatic. The Bruns term, the reduction from the geoid to the spheroid of reference of the gravity formula, can also be applied only qualitatively to explain an observed gravity anomaly. Criticism is also made of Hopfner's identification of the Bruns term with Bowie's reduction, but Heiskanan shows that the concepts are different.--R. S. Read. Abstract reprinted from Science Abstracts, vol. 34, No. 404, Aug., 1931, p. 665.

2. MAGNETIC METHODS

(752) TEST-DEFLECTIONS FOR VARIOMETERS AND MAGNETOGRAPHS

By George Hartnell

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 36, No.4, 1931, pp. 279-296

This paper develops equations describing the deflections of a suspended magnet produced by a deflecting-magnet fixed in any desired position. The distances are assumed to be large enough to render distribution effects negligible. The equations are applied individually to a declination (D), horizontal intensity (H), and vertical intensity (Z) variometer, and to an assembly of these three variometers, which constitute a magnetograph. Under the conditions assumed, the equations furnish a convenient means of testing magnetic instruments. Since such instruments contain one or more magnets as essential parts, their response to magnetic forces as theoretically deduced provides a criterion of their merit.—Author's abstract.

(753) MAGNETIC SECULAR VARIATION FOR EPOCH 1930

By C. C. Ennis

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 36, No. 4, 1931, pp. 315-317.

This paper is a contribution in the field of magnetical investigation to J. Bartels' article "Geophysical stereograms" published in vol. 36, No. 3, 1931, of Terrestrial Magnetism (Geophys. Abs. 33, p. 334). Ennis makes available the data employed in the construction of stereogram 8 which shows the secular variation of the magnetic field-vector at the intersections of the meridians 0°, 20°, 40°, etc., with the circles of latitude 60°N., 40°N., - - - 40°S.

As the resulting salient features of the secular variation were pointed out by Bartels, the author gives here only the data upon which the stereogram depends. They are shown in a table.--W. Ayvazoglou.

(754) LES ÉLÉMENTS DU MAGNÉTISME TERRESTRE À JASSY EN 1931

(THE ELEMENTS OF THE TERRESTRIAL MAGNETISM AT JASSY IN 1931)

By St. Procopiu

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 36, No. 4, 1931, pp. 341-343.

In this article the author gives the results of measurements of magnetic elements carried out by him, together with Gh. Vasiliu, in 1931 near Jassy (Roumania), where a magnetic anomaly was established, and compares his data with those obtained by Hepites and Murat in 1898.—W. Ayvazoglou.

(755) PRELIMINARY REPORT OF THE MAGNETIC OBSERVATIONS MADE DURING THE AEROARCTIC EXPEDITION OF THE GRAF ZEPPELIN, 1931.

By Gustaf S. Ljungdahl

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 36, No. 4, 1931, pp. 349-355.

The magnetic work during the arctic expedition of the airship Graf Zeppelin in July, 1931, was undertaken for the purpose of studying the possibilities of making magnetic measurements under the conditions involved and of obtaining as valuable observations as possible. A preliminary report of the results is presented in this article.

The determinations of the horizontal intensity (H) were made with the double compass. This investigation was subsidized by the Carnegie Institution of Washington. The results are given in a table.

An attempt was made to determine the declination (D) with a Thomson compass rose with fibre suspension, fashioned according to a model of Dr. Haussmann, by projection of the sun's shadow on the card. Only a few determinations were made, owing to the difficulties of taking the sun's bearing from the compass position.

The undamped compass rose often was subject to great and irregular oscillations and vibrations. Accordingly the results are not considered to be very exact.

For measurements of the vertical intensity (Z) Schmidt's field balance was mounted in gimbals and taken on board. The sensitivity was diminished from 30 γ to about 200 γ per scale division. No measurements could be obtained, owing to slipping of the magnet system caused by vibrations of the airship.--W. Ayvazoglou.

(756) GEOLOGISTS HEAR TALK ON GEOPHYSICAL METHODS

Editorial note

The Oil and Gas Journal, Tulsa, vol. 30, No. 37, 1932, p. 121.

In a lecture before the Shreveport Geological Society on January 21, 1932, W. M. Barret outlined the principles of the magnetic method of prospecting. Measuring instruments used in the field and laboratory apparatus developed for improving the technique of interpreting the field data in terms of geologic structure were discussed.--W. Ayvazoglou.

(757) ZU FOLGHERAITERS BESTIMMUNGEN DES MAGNETISCHEN ERDFELDES AUS DER MAGNETISIERUNG GEBRANNTER TONGEGENSTÄNDE

(CONCERNING FOLGHERAITER'S DETERMINATIONS OF THE MAGNETIC EARTH FIELD FROM THE MAGNETIZATION OF BAKED EARTHEN-WARE)

By. J. Koenigsberger

Gerlands Beiträge zur Geophysik, Leipzig, vol. 35, No. 1, 1932,
pp. 51-54.

About 35 years ago Folgheraiter determined the magnetic inclination i at the Roman and Etrurian epochs by measuring the direction of the remanent magnetization in vases, assuming that they were baked standing on their bases. Folgheraiter found i to be about the same as at the present time (+57°) in the year 100 after Christ and from +2° to +25° in the years 700 and 500 B.C.

Examination of the following questions was made by Koenigsberger to prove Folgheraiter's conclusions:

1. Is it possible to calculate exactly the inclination by measuring the three perpendicular components of the remanent magnetization?
2. Is the direction of the inclination influenced by quick changes of the temperature?
3. Does the additional burning of black color (as is used on antique vases) cause any change?
4. How great is the quotient $J_r : K \cdot T$ for similar materials, T being the present-time total intensity and K the susceptibility?

The experiments have shown that:

1. The accuracy was about ± 1°.
2. The remanent inclination was not changed by the temperature differences while baking.
3. The additional burning must be made at about 300° in order that no changes of the previous remananent magnetization could be caused.
4. Values similar to those of the most eruptive rocks were found.

The small values of inclination obtained by Folgherait for the Etrurian epoch can probably be explained by the supposition that the Etrurians baked the vases by putting them in horizontal position, or that they rebaked them in horizontal position while fastening the handles.—W. Ayvazoglou.

(758) INVERSION DE L' INCLINAISON MAGNÉTIQUE AUX ÂGES GÉOLOGIQUES. NOUVELLES OBSERVATIONS

(INVERSION OF MAGNETIC INCLINATION THROUGH GEOLOGICAL AGES. NEW OBSERVATIONS)

By P. L. Mercanton

Comptes Rendus, Académie des Sciences a Paris, vol. 192, No. 16,
1931, pp. 978-980.

In this article the author discusses facts collected from the study of the remanent magnetism of various samples of volcanic lava from both hemispheres (Greenland, Spitzbergen, Australia), indicating that at Tertiary epochs, at the time of large volcanic eruptions, the terrestrial magnetic inclination was opposite to that existing now. Magnetic inclinations of a series of samples are given.--W. Ayvazoglou.

(759) MAGNETISMUS RIPU (IN BOHEMIAN)
(MAGNETISM NEAR RIP)

By V. Spacek and B. Zahálka

Rozpravy II, Tridy Ceske Akademie, Prague, vol. 39, No. 48, 1929,
pp. 1-15.

Theoretic and practical remarks on the sensitivity of Schmidt's variometer are given in the introduction to the article.

Results of the measurements of the differences

$$\Delta V = V - V_0$$

in which V is the vertical component of the terrestrial magnetism near Rip are given. The results are shown in a map.

The article is concluded by a supplement written by B. Zahálka in which the results of geophysical measurements carried out by Spacek are compared with the geological survey carried out by Zahálka.

According to the results it was established that there were two systems of faults in the tectonic of the surroundings of Rip, one W. NW. - E. SE. and the other S. SW. - N. NE. Rip is situated at the point of intersection of the two most important faults. These faults are characterized not only by magnetic anomalies but also by geological structure; thus there is no doubt about their existence. The results proved also the hypothesis established on this subject by Professor Laska. This hypothesis was the main reason for carrying out the measurements.--Authors' abstract translated by W. Ayvazoglou.

(760) STANOVENI AZIMUTU PRI PODROBNEM MERENI MAGNETICKÉ DEKLINACE (IN BOHEMIAN)

(DETERMINATION OF THE AZIMUTH IN THE ACCURATE MEASUREMENT OF MAGNETIC DECLINATION)

By V. Spacek

Special reprint from the Zememericky Vestnik, No. 7, 1930.

In measuring declinations the astronomic determination of the geographical meridian usually takes much time. In this article the author shows that on a small area it is sufficient, in carrying out the measurements, to determine the direction of the meridian at one place only.

At the other places the measurement is made by angles only, as in Pothenot and Hansen problems.

By the method described the effect of the various geological formations on the magnetic inclination can be determined over a small area at as many places as at which can be measured the vertical component by Schmidt's variometer during one day--Author's abstract translated by W. Ayvazoglou.

3. SEISMIC METHODS

(761) TRAVEL-TIME CURVES AT SMALL DISTANCES AND WAVE VELOCITIES IN SOUTHERN CALIFORNIA

By B. Gutenberg

Gerlands Beiträge zur Geophysik, Leipzig, vol. 35, No. 1,
1932, pp. 6-45.

The study of local shocks in California may now be made with considerable accuracy in many cases, owing to the system of seismological stations in this country.

Gutenberg's studies of travel-time curves at small distances and wave velocities in southern California are described in this article under the following headings:

1. The seismological stations. A list of stations with data concerning them is given in Table 1. The location of most stations is shown in a figure.

2. The shocks. Only those shocks were used whose epicenters seemed to be certain within a very few kilometers. Data on the shocks used for the investigations are shown in Table 2. Table 3 shows calculation of epicenters and

origin times, and Table 4 contains an enumeration of seismograms for investigation of travel times.

3. The $\overline{P}$ waves. By using the epicenters given in Table 2 and the corresponding distances for every shock, the apparent velocity of the $\overline{P}$ waves was calculated. Table 5 shows the result. Table 6 gives the observed travel time of the $\overline{P}$ waves minus distance divided by 5.55. The principal result of Table 6 is that at distances between 44 and 85 kilometers the waves generally arrived 0.3 second earlier than would correspond to an apparent velocity of 5.55 kilometers per second. Between 100 and 200 kilometers this difference decreased to a mean of 0.1 second; in the interval which followed the difference was practically zero; at distances of over 400 kilometers the difference was nearly always negative, and the mean passed below -1.0 second between 500 and 600 kilometers. The most probable values of the travel times of $\overline{P}$ in southern California are given in Table 7.

4. P_n and P_x. The travel times (calculated from the observed times of arrival of P_n and the origin times as given in Table 2) are shown in Table 8. Travel times of P_n and difference in the travel times of $\overline{P}$ and P_n according to various investigations are shown in Table 9. In Table 10 the observed times of the P_x wave and the observed time differences $P_x - P_n$ are given. Table 11 shows the mean travel times of the P_x wave in California, the mean differences $P_x - P_n$ and the corresponding values found by Conrad with respect to the Schwadorf (Austria) shock.

5. Other waves between P_n and $\overline{P}$. Between P_n and $\overline{P}$ there are some other well-marked phases. They can be divided into two classes: Waves of the first class are well marked at short distances. The second class of waves between P_n and $\overline{P}$ is noticed especially at greater distances. In the seismograms of the California shocks two kinds of waves of the first class could be found -- P_m and P_y -- and three kinds of the second class -- a, b, and c. The time differences of all these waves compared with P_n are plotted in a figure.

6. S waves and surface waves. Observed travel times and mean travel times of S waves and surface waves are given in tables.

7. Other waves. It is known that if a longitudinal or a transversal wave touches a surface between two different layers, it divides into four waves. Since there are several surfaces of this kind within the upper 40 kilometers of the earth's shell, a large number of reflected and refracted waves must be expected. Probable travel time curves of such waves at various distances are given in figures.

8. The depth of foci. From the results of the investigation the author derived that very probably all shocks originated at a depth between 10 and 15 kilometers.

9. The thickness of layers in southern California. Assuming the depth of a focus at 12 kilometers, the thickness of the first (granitic) layer is calculated to be 14 kilometers. This thickness of 14 kilometers agrees very well with the value of 15 kilometers found by Byerley (Bulletin of the National Research Council, No. 61, p. 88, Washington, July, 1927), Wood and Richter (Bulletin of the Seismological Society of America, vol. 21, p. 28, 1931) from blasts.

References complete the article.--W. Ayvazoglou.

(762) MIT WELCHER GENAUIGKEIT LÄSST SICH DIE SCHALLGESCHWINDIGKEIT IN DER STRATOSPHÄRE FINDEN?

(AT WHAT ACCURACY CAN THE VELOCITY OF SOUND IN THE STRATOSPHERE BE DETERMINED?)

By B. Gutenberg

Gerlands Beiträge zur Geophysik, Leipzig, vol. 35, No. 1, 1932, pp. 46-50.

In a recent paper (Velocity of Sound and the Temperature in the Stratosphere; Geophys. Abs. 21, p. 28), Gutenberg tried to show that in general the height at which the temperature of the stratosphere begins to increase more rapidly is greater in summer than in winter. There are very many effects due to unavoidable errors, especially the effect of the wind at heights above 10 kilometers, in general unknown. A simple method has been used by Gutenberg to calculate the results within the limits caused by the errors. Some objections to this method were raised by F. J. W. Whipple in his article entitled. On Methods of Estimating the Heights Reached by the Air-Waves Which Descend in Zones of Abnormal Audibility, published in Gerlands Beiträge, Vol. 31, No. 1-3, 1931, pp. 158-163.

In this article Gutenberg examines the objections raised by Whipple.--A. Ayvazoglou.

(763) ON THE RAYLEIGH WAVE PROPAGATING OVER THE SURFACE OF A HETEROGENEOUS MATERIAL

By H. Honda

Geophysical Magazine, Tokyo, vol. 4, No. 2, 1931, pp. 137-145.

The problem of the surface wave of Rayleigh's type propagating along the surface of a heterogeneous material, of which Lamé's constants λ and μ increase linearly with increasing depth and the density remains constant throughout the material, was solved approximately under some assumptions. And the expressions showing the velocity, the dispersion of the wave propagation, and the displacement components of the particles of the material and so on were obtained.—Author's abstract.

(764) REPORT ON THE ACTIVITY OF THE EARTHQUAKE RESEARCH INSTITUTE, TOKYO IMPERIAL UNIVERSITY, DURING THE SECOND HALF OF 1930

By Chuji Tsuboi

Gerlands Beiträge zur Geophysik, Leipzig, vol. 35, No. 1, 1932, pp. 113-122.

This is the fourth report in which Tsuboi summarizes the results of an investigation carried out by the Earthquake Research Institute during the second half of 1930 (for previous reports see Geophys. Abs. 10, 16, and 24).

The items of this report are as follows:

1. Seismic activities in Idu Peninsula. An outline of the scheme of investigations carried out by the members of the institute is given. The results will be published in due course.

2. Instrumental. M. Ishimoto elaborated an accelerometer for the purpose of observing earthquake accelerations. With this instrument it is possible to obtain records of earthquake accelerations on smoked paper solely by mechanical means. The proper oscillation period of the pendulum of the accelerometer is 0.15 second and the statical magnification 200.

3. (1) Terada has calculated the heat generated in a deformation of the earth's crust. (2) Terada, Miyabe, and Tsuboi have calculated the areal expansions and contractions of various earthquakes and volcanic districts by using as data relative displacements of triangulation points.

4. Statistical. (1) Yamaguchi studied the aftershocks of the Kwanto earthquake of 1923, of the Tango earthquake of 1927, the Tasima earthquake of 1925, and of the Oomachi earthquake of 1918 with respect to tidal heights in the seas nearest to the respective seismic region. (2) Takayama and Suzuki made a statistical study of the relation between sunspot activity and the occurrence of destructive earthquakes in Japan.

5. Mathematical. Sezawa and Nishimura discussed mathematically the deformation of a single shock with its propagation through an elastic medium for two cases; one was related to the propagation of a shock through a medium composed of different parts of different elastic constants and densities, with

their boundaries parallel to the wave front, while the other was related to the propagation of a shock through a medium which is horizontal and dispersive in itself.--W. Ayvazoglou.

4. ELECTRICAL METHODS

(765) PROGRESS AND PROBLEMS OF ELECTRICAL PROSPECTING (IN RUSSIAN)

By Parfenov, Melikian and Nikitin

Azerbaidjanskoe Neftianoe Khoziaystvo, Baku, vol. 12, No. 1, 1932,
pp. 7-14.

Schlumberger's method for studying the formations penetrated by drill holes, "electrical coring," and its application in the oil region of Azneft in the U. S. S. R. are discussed. The development of this method during the year 1930-1931 is illustrated by a figure. A series of diagrams showing the results of investigations of drill holes by the electrical coring method is given.

The authors conclude that this method is of great importance in geological interpretation of the subsoil and should be used on a large scale.--W. Ayvazoglou.

(766) GOLD DEPOSITS OF NORTH SWEDEN

Editorial note

The Mining Journal, London, vol. 176, No. 5035, 1932, pp. 124-125.

The important possibilities of the Boliden district in north Sweden, the main deposit of which was discovered in 1924 by electrical methods of prospecting, are described. Of the many indications obtained by the geophysical method, only comparatively few of the more promising indications were tested by the drilling.--W. Ayvazoglou.

(767) DER EINFLUSS DER ANISOTROPIE DER GESTEINSMEDIEN AUF DIE VERTEILUNG NIEDERPERIODISCHER, ELEKTROMAGNETISCHER WECHSELFELDER

(INFLUENCE OF THE ANISOTROPY OF THE EARTH'S ROCK MEDIA ON THE DISTRIBUTION OF LOW-PERIOD ELECTROMAGNETIC ALTERNATING FIELDS

By Max Müller

Gerlands Beiträge zur Geophysik, Leipzig, vol. 30, No. 1/2, 1931,
pp. 142-195.

Contents of the paper: (1) Introduction and the objects of the research. (2) Apparatus for the production and measurement of small period electromagnetic alternating fields of any low frequency. (3) Calculation of the current field of an electric dipole in connection with frequency, conductivity, and thickness of strata. Setting forth of the conditions for the disappearance of the source-free secondary current. (4) The influence of the anisotropy of the rock media on the distribution of stationary currents. (5) Graphic calculation of the magnetic field of a double source with consideration of the decrease of the current density with depth. (6) Electromagnetic field measurements by means of a current directly conducted to the earth: (a) Experimental research on the influence of frequency and anisotropy on the distribution of the components of the magnetic field of a double source; exposition of a new method for the determination of the mean conductivity of the earth; (b) investigation of a series of strata by means of low-frequency alternating current; (c) measurement of a deposit of Thuringian magnetite by means of low-frequency alternating current; (d) investigation of a [illegible]-pyrite deposited by means of low-frequency alternating current. (7) Theory of the inductive methods: (a) Calculation of the magnetic field of a stationary circular current; (b) investigation of the dependence of frequency of eddy currents induced in the earth's crust by a closed alternating current; (c) conclusions drawn from the theories of Levi-Civita and Pollaczek. (8) Inductive field measurements by means of alternating currents of various frequency: (a) Investigation of the dependence on frequency of the distribution of the magnetic field of a right-angled cable traversed by an alternating current; discussion of the influence of anisotropy on the Jena shell limestone; (b) investigation of a series of strata by means of low-period electromagnetic alternating fields; (c) investigation of the magnetic external field of a low-period circular current upon anisotropic rock media.

The paper is illustrated by 51 figures including diagrams of apparatus and curves showing the results of observations.--W. Ayvazoglou.

(768) ELECTRICAL CORRELATION OF CROSS-SECTIONS ACCORDING TO INFORMATION OBTAINED FROM LENIN'S REGION (IN RUSSIAN)

By E. Sarkisianz

Aserbaidjanskoe Neftianoe Khoziaystvo, Baku, vol. 12, No. 1, 1932,
pp. 14-21.

Investigations of drill holes in the Lenin's oil-bearing region by means of Schlumberger's "electrical coring" are described. A series of cross sections of the holes is given. According to the author, more tests are required to draw definite conclusions on the degree of usefulness with which electrical coring can be applied in the region described.—W. Ayvazoglou.

(769) RESULTS OF THE APPLICATION OF THE "ELECTRICAL CORING" IN STALIN'S REGION (IN RUSSIAN)

By M. Babaian, V. Listengarten, V. Gorin and G. Zaturov

Azerbaidjanskoe Neftianoe Khoziaystvo, Baku, vol. 12, No. 1,
1932, pp. 21-27.

Electrical coring was applied in Stalin's oil-bearing region for the first time in January, 1931. One hundred and eighty drill holes were investigated during one year. In this article the authors examine the results obtained from the application of Schlumbergerger's method by comparing the diagrams of the cross sections of a series of drill holes.

Summing up the results of the investigation the authors say that electrical coring must be recognized as one of the most useful and necessary methods on determining the correlations in the stratigraphical conditions of oil deposits.--W. Ayvazoglou.

(770) RESULTS OF THE APPLICATION OF THE ELECTRICAL CORING IN THE ORDJONIKIDZE'S REGION (IN RUSSIAN)

By D. Jabrev and M. Emelianov

Azerbaidjanskoe Neftianoe Khoziaystvo, Baku, Vol. 12, No. 1,
1932, pp. 28-30.

Two hundred and twenty drill holes were investigated from October, 1930, to January, 1932, by Schlumberger's electrical coring method.

The problem was to prove, based on the results from the interpretation of the data obtained, that stratigraphical conditions of the ground can be determined in most cases by electrical coring only, and that thus the expensive and slow procedure of mechanical coring can be avoided. On a series of diagrams the solution of this problem is examined and the great advantages of electrical coring are positively established.--W. Ayvazoglou.

(771) THE FIRST PRELIMINARY SUMMARIES OF ELECTRICAL CORING IN KIROV'S REGION (IN RUSSIAN)

By S. Movsesian

Azerbaidjanskoe Neftianoe Khoziaystvo, Baku, vol. 12, No.1,
1932, pp. 31-35.

Electrical coring has been used in Kirov's region since November, 1930, as it was proved that the correlation of the stratigraphical conditions of the subsoil could be determined and the oil-bearing and water-bearing horizons established by this method. Almost all the holes drilled since March, 1931, were investigated by electrical coring. Whether the mechanical coring can entirely be substituted by this method or not can not, according to the author, be definitely decided at present.

A series of diagrams showing the cross sections of the holes and a plan of Kirov's region are added.—W. Ayvazoglou.

5. RADIOACTIVE METHODS

(772) FURTHER EXPERIMENTS ON THE UNIFORMITY OF DISTRIBUTION OF THE COSMIC RADIATION

By Robert A. Millikan

The Physical Review, Minneapolis, vol. 39, No. 3, 1932, pp. 391-396.

More careful and prolonged observations on the small, daily variations before reported in the measured intensities of the cosmic rays, the new observations being made under such conditions as to eliminate the possibility of a slight temperature effect suggested by Bowen and Millikan's recent explanation of ionization-pressure relations in high-pressure electroscopes, yield the definite result that "within the limits of the author's present observational uncertainty, which is of the order of a third of a per cent, the sun has no direct influence on cosmic-ray intensities." New evidence is presented that if observed and apparently systematic variations of the order of a third of a per cent are in fact real, they are best interpreted as the result of small changes in the blanketing effect of the earth's atmosphere due to air currents.—Author's abstract.

(773) INVESTIGATIONS OF KENNELLY-HEAVISIDE LAYER HEIGHTS FOR FREQUENCIES BETWEEN 1,600 AND 8,650 KILOCYCLES PER SECOND

By T. R. Gilliland, G. W. Kenrick, and K. A. Norton

Bureau of Standards Journal of Research, Washington, D. C., vol. 7, No. 6, 1931, pp. 1083-1104

The contents of this paper are as follows:

I. Introduction.
II. 4,045-kilocycle observations.
III. Virtual layer heights as a function of frequency during daytime.
IV. Diurnal variations.
V. Analytical discussion of results: (1) Refraction; (2) reflection phenomena.
VI. Conclusions.

The results of observations of the height of the Kennelly-Heaviside layer carried out near Washington, D. C., during 1930 are presented. Evidence for the existence of two layers (corresponding closely in virtual height to the E and F regions discussed by Professor Appleton) is found during daylight on frequencies between 3 and 5 megacycles. The modification in the virtual height of the higher F layer produced by the existence of a low E layer is investigated theoretically, and the possibility of large changes in virtual height near the highest frequency returned by the E layer is pointed out.

A number of oscillograms showing the characteristic types of records observed during the tests are presented, with a graph of average heights for January to October, 1930.--Authors' abstract.

(774) SYSTEMATIC ERRORS IN MEASUREMENTS OF IONIC CONTENT AND THE CONDUCTIVITY OF THE AIR

By O. H. Gish

Gerlands Beiträge zur Geophysik, Leipzig, vol. 35, No. 1, 1932, pp. 1-5.

It is pointed out that the possible source of error in ionic content and air-conductivity measurements made with the charging method, which were discussed in recent papers by Yo Itiwara (Geophys. Abs. 25) and by J. Scholz (Geophys. Abs. 24), were recognized when this method was adopted in the Department of Terrestrial Magnetism of the Carnegie Institution of Washington, and that suitable provisions were made to obviate such errors. The design of ion counter which embodies these provisions is described in detail.

The effect of large ions upon the ionic-content measurements, and of distortions of the earth's field in the region from which air is drawn for both ionic-content and air-conductivity measurements, are discussed. It is concluded that these sources of error are negligible for the conditions prevailing on the "Carnegie" at sea.—Author's abstract.

(775) ACTION OF THE EARTH'S MAGNETIC FIELD ON PENETRATING RADIATION

By B. Rossi

R. Accademia Nazionale dei Lincei, vol. 13, January 4, 1931, pp. 47-52.

Referring to his experiments in which he confirmed Bothe and Kolhörster's results, which showed that even at sea level there exists a penetrating ultra-radiation, the author describes further researches made to test whether the penetrating radiation (cosmic radiation) is affected by the magnetic field of the earth. If the penetrating radiation reaches the limit of the atmosphere as a corpuscular radiation having an energy of some thousands of volt-electrons, the terrestrial magnetic field should give place to a strong dissymmetry in its distribution of intensity with respect to the plane of the magnetic meridian. Experiments carried out to put in evidence this dissymmetry gave a negative result. --J. J. Stewart; Reprinted from Science Abstracts, vol. 34, No. 407, 1931, p.989.

(776) ÜBER EXAKTE INTENSITÄTSMESSUNGEN DER HESSCHEN ULTRASTRAHLUNG

(EXACT MEASUREMENTS OF THE INTENSITY OF HESS' COSMIC RADIATION)

By G. Hoffmann

Zeitschrift für Physik, Berlin, vol. 69, No. 11/12, 1931, pp. 703-718.

For obtaining higher accuracy in measuring the intensity of cosmic radiation according to the ionization method, not only a great amount of gas but also a full compensation of charges is necessary. The results of experiments carried out with the large Twin-apparatus (Zwillingsapparat) are shown by curves. A strong meteorological influence on the soft radiation is apparent. In the case of hard radiation there is noticeable, next to the dependence on pressure of the air, also a direct or indirect influence of the sun. The problem of a proof, free from objection, of the possible existence of a sidereal time period seems to be a very difficult one.--Author's abstract translated by W. Ayvazoglou.

(777) ÜBER NEUE ARBEITEN AUF DEM GEBIETE DER KOSMISCHEN ULTRASTRAHLUNG

(CONCERNING NEW WORKS ON COSMIC RADIATION)

By V. F. Hess

Elektrotechnische Zeitschrift, Berlin, vol. 52, No. 29, 1931, pp. 936-937.

The purpose of this article is to inform the readers on several new important works concerning ultra-radiation which appeared since Regener's lecture delivered at the meeting of the Electrotechnical Association and Heinrich-Hertz Society in Berlin (November 18, 1930). This article deals especially with the ionization of the higher layers of the atmosphere and with the latest views of the nature and origin of the cosmic ultra-radiation.--Author's abstract translated by W. Ayvazoglou.

(778) REPARTITION ANGULAIRE DES RAYONS ULTRAPÉNÉTRANTS (RAYONS COSMIQUES)

(ANGULAR DISTRIBUTION OF COSMIC RADIATION)

By D. Skobelzyn

Comptes Rendus de l'Académie des Sciences, Paris, vol. 194, No. 1, 1932,
pp. 118-121.

The author shows the distribution of cosmic radiation between the various angular zones as determined from statistical material collected by him.

The results are given in two figures.--W. Ayvazoglou.

(779) SUR LA THÉORIE DE L'AURORE POLAIRE

(ON THE THEORY OF THE AURORA BOREALIS)

By A. Dauvillier

Comptes Rendus de l'Académie des Sciences, Paris, vol. 194, No. 2, 1932, pp. 192-194.

The purpose of this article consists of verifying the theory concerning the aurora borealis, based on new observations made at the Sodankylä magnetic station (Lapland). The following conclusions drawn by the author are given briefly:

1. The observations confirm entirely the opinion that the aurora represents the secondary effect of the initial cosmic phenomenon which occurred very far away from the earth.

2. The phenomenon consists of two phases: The first corresponds to the initial cosmic effect and sometimes lasts only a very short time; the second is phosphorescence, losing slowly its brightness, due to the excitation, ionization, and polymerization (ozone) produced by secondary electrons.

3. The phenomenon presents a simple theoretical aspect only when the intensity remains weak. As soon as it increases the phenomenon becomes more complicated by secondary effects which are no longer of the cosmic nature.

4. Photometric estimation of the brilliancy of a screen observed in the zenith made it possible to calculate the energy spent during an aurora storm by admitting the same luminous yield (10^{-2}) as that in the case of a vacuum tube.

5. These observations were accompanied by measurements of the gradient of the atmospheric potential.

6. The measurement of the intensity of cosmic radiation showed fluctuations of 2.5 per cent, or five times greater than the errors of the measurement; they could not be attributed to variations of atmospheric pressure or to the magnetic activity.--W. Ayvazoglou.

(780) RADIOAKTIVITA DISLOKACI NA PRIBRAMSKU (IN BOHEMIAN)

(RADIOACTIVITY OF THE DISLOCATIONS IN THE DISTRICT OF PRIBRAM)

By Jaroslav Splichal

Rozpravy 11, Tridy České Akademie, Pregue, vol. 40, No. 24, 1930, pp. 1-20.

The district of Pribram offers the occasion for measuring the radioactivity of soil-air not only in the sediment rocks but also in the granite and in the contact. The radioactivity was evaluated by pumping soil-air out of a bore hole 25 to 35 centimeters deep into the ionization chamber placed on a Wulf's electrometer.

The results of the measurements were as follows:

According to Profile I, shown in the appendix, the activity of soil-air in the granite (490 volts per hour) was much greater than that in the Algondian slates (104 volts per hour).

The radioactivity of the soil-air was the greatest in the granite; average results were 2.2 to 3.6 Mache or 6.10^{-10} grams of the element radium per liter of the soil-air measured.

Algondian schists had an activity of 0.9 Mache or 1.5×10^{-10} grams of the element radium.

The size of the emanation in the Cambrian conglomerates and Cambrian graywackes depended on the amount of detritus of igneous rocks.

The greatest activity was found in the conglomerate of Zitec (Cα_1) 1.2 Mache or 2.10^{-10} grams of the element radium.

The conglomerate of Hluboš (Cα_2) and the graywacke of Sadec-Bohutin (Cα_3) had the values of 0.2 Mache or 0.4×10^{-10} grams of the element radium.

The results of the measurements of radioactivity on the dislocations are graphically reproduced in the profiles. There the distances of the boreholes are plotted as abscissas, the radioactive values of the soil-air in volts per second as ordinates. The following relations are deduced from the radioactive profiles:

1. The fault between the granite and the schist has a fluctuating radioactivity of the soil-air, the value of which is the mean of that of the granite and of the schist.

2. The dislocations in the schists show a maximum activity.

3. The activity on the dislocation in the granite between the two complexes is smaller than in the granite itself.

The measurements of radioactivity on the "clay-split" had also shown that the radioactivity is greater in the dislocation than in the neighborhood.--Author's abstract.

6. GEOTHERMAL METHODS

(781) TEMPERATURE MEASUREMENTS IN THE DEEP CIECHOCINEK WELL (IN POLISH)

By Jan Moniak and Stanislaw Zych

Kosmos, Lwow, vol. 55, No. 1-2, 1930, pp. 423-427.

The results of temperature measurements carried out on July 28, 1929, in the deep well Ciechocinek No. 14 are given in the following table:

Time during which the thermometers were left in the well		Temperature of the outside air, °Cel.	Depth, meters	Separate readings of the thermometers			Temperature accepted, °Cel.
Hours	Minutes						
2	25	19	50	31.5	31.5	31.5	31.5
1	40	18	100	31.55	31.55	31.55	31.55
2	25	19	200	31.6	31.55	31.55	31.55
1	40	18	300	31.7	31.65	31.65	31.65
1	40	18	400	31.95	31.9	31.9	31.9
1	40	18	500	32.15	32.05	32.05	32.05
1	40	18	600	32.2	32.1	32.1	32.1
1	40	18	700	32.45	32.45	32.4	32.45
1	40	18	800	32.7	32.7	32.7	32.7
2	25	19	900	33.05	33.0	32.95	33.0
2	25	19	1,000	33.5	33.5	33.5	33.5
2	25	19	1,100	34.0	33.9	33.9	33.9
2	25	19	1,140	34.0	34.0	34.05	34.0

The purpose of the measurements was to establish the temperature of thermal salt waters required for baths.--W. Ayvazoglou.

7. UNCLASSIFIED METHODS

(782) ABSTRACT OF THE INNSBRUCK MEETING OF THE COMMISSION OF TERRESTRIAL MAGNETISM AND ATMOSPHERIC ELECTRICITY OF THE INTERNATIONAL METEOROLOGICAL ORGANIZATION AND OF THE RESOLUTIONS ADOPTED SEPTEMBER 21-23, 1931

By H. D. Harradon

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 36, No. 4, 1931, pp. 319-323.

In this article Harradon gives a summary of resolutions adopted by the Commission of Terrestrial Magnetism and Atmospheric Electricity of the International Meteorological Organization on the following principal items:

1. Publication of the magnetic character-numbers.

2. Relations between the commission and the Association of Terrestrial Magnetism and Electricity of the International Union of Geodesy and Geophysics.

3. The various questions pertaining to the work during the Polar year.

4. Study of the relations of the moon and the magnetic elements.

5. The question of the location of new observatories for terrestrial magnetism and electricity.--W. Ayvazoglou.

(783) ABSTRACT OF THE INNSBRUCK MEETING OF THE INTERNATIONAL COMMISSION FOR THE POLAR YEAR 1932-33 OF THE INTERNATIONAL METEOROLOGICAL ORGANIZATION AND OF THE RESOLUTIONS ADOPTED SEPTEMBER 23-26, 1931.

By H. D. Harradon

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 36, No. 4, 1931, pp. 324-332.

The principal matters brought before the sessions of the commission were indicated in the report of President D. la Cour, an abstract of which is given by Harradon.

In the second part of the article Harradon gives a summary of resolutions adopted at the Innsbruck meeting.--W. Ayvazoglou.

(784) SUMMARY OF THE YEAR'S WORK, DEPARTMENT OF TERRESTRIAL MAGNETISM, CARNEGIE INSTITUTION OF WASHINGTON

By J. A. Fleming

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 36, No. 4, 1931, pp. 333-340.

This is an extract from the annual report in Year Book No. 30 of the Carnegie Institution of Washington for the year July 1, 1930, to June 30, 1931.

The following principal items of the work carried out by the institution are mentioned: (1) Participation in formulation of plans for the Jubilee International Polar Year proposed in 1932-33; (2) interpretation of accumulated data and the study of magnetic correlations with other geophysical, solar, and cosmic phenomena; (3) study of magnetic records and tabulations derived from observations at Watheroo, Western Australia, during the 12 years 1919-1930; (4) investigation of correlation of the initial impulses of magnetic storms; (5) investigations in atmospheric electricity; (6) carrying out of programs at the Watheroo and Huancayo observatories concerning magnetic, atmospheric-electric, earth-current, and meteorological observations; (7) demonstration by measurements of the artificially produced beta and gamma rays of energies equivalent to most of those emitted by radioactive substances, using equipment developed at the Department; (8) reductions and compilations of the work in physical and chemical oceanography from observations made aboard the "Carnegie"; (9) instrumental advances for magnetic and electric determinations.

The following theoretical investigations, mostly in continuation of those noted in the last year's summary, are given: (1) Solar activity and secular variation; (2) magnetic activity; (3) magnetic storms; (4) arctic magnetic charts; (5) magnetic work at sea and dynamic-deviation investigation; (6) photographic method of changing the ratio of ordinate scale to abscissa scale; (7) atmospheric pollution.

The first of a contemplated series of manuscripts giving detailed descriptions of the department's specially designed apparatus required in its research fields was completed by Torreson. A second manuscript by Gish on the earth-resistivity apparatus is in preparation.--V. Ayvazoglou.

(785) WISSENSCHAFTLICHE UND PRAKTISCHE AUFGABEN DER ANGEWANDTEN GEOPHYSIK

(SCIENTIFIC AND PRACTICAL PROBLEMS OF APPLIED GEOPHYSICS)

By O. Meisser

Berichte Freiberger Geologischen Gesellschaft, vol. 13, 1931, p. 44.

The translation of the abstract published by M. Henglein in the "Neues Jahrbuch für Mineralogie, Geologie, und Paläontologie," 1931, No. 5, p. 628, reads as follows:

The purpose of applied geophysics consists in carrying out structure investigations of physical fields on the surface of the earth. The pure physical problems consist of development the necessary methods by using corresponding instruments, and of collecting the proper constant data. Based on these methods practical application of geophysics in mining is possible; a great number of geological problems may be disclosed by corresponding geophysical surveys over large areas.

Improvements in instruments used for pendulum measurements are discussed. By using the three new Jena methods of observation and the apparatus for the relative gravity measurements the gravity difference can be determined simultaneously at several stations with an accuracy corresponding to that of the torsion-balance measurements.

The principle of the Eötvös torsion balance is explained by an example relating to brown-coal investigation. Combination of the torsion balance and pendulum is mentioned.

Concerning magnetic measurements some arrangements of H and Z components by which the variations of the components can be determined were shown. The progress in electrical methods of measurement is explained. The possibility of determining single layers by seismic methods is mentioned.

Attention is drawn to radioactive and geothermal measurements. Emphasis is laid upon the necessity of further developing instruments and methods. The importance of detailed measurements of smaller areas with regard to gravity and magnetic elements, and in solving geological and industrial questions is especially stressed.--W. Ayvazoglou.

(786) SUMMARY OF THE GEOLOGICAL CONFERENCE (IN RUSSIAN)

By A. M.

Azerbaidjanskoe Neftianoe Khoziaystvo, Baku, vol. 11, No. 11/12, 1931, pp. 3-7.

In this summary the author mentions Schlumberger's electrical coring and its usefulness in determining the character of formations traversed in drilling. Four French parties have been working in Baku since 1930.

Geophysical section reported on electrical, gravitational, and magnetic methods of prospecting carried out by the Azneft. The conference considered it necessary to have six parties for carrying out electrical coring in Baku and one each in the Grozneft, Turkmenneft, and Uzbekneft. The organization of a series of parties for electrical and magnetic prospecting was also decided.--W. Ayvazoglou.

(787) NEW OIL RESERVES (IN RUSSIAN)

By K. Riabinin and G. Helkvist

Azerbaidjanskoe Neftianoe Khoziaystvo, Baku, vol. 11, No. 11/12, 1931, pp. 101-105.

The authors describe a series of new probable locations of oil discovered by various geophysical methods of prospection. The most important of them are as follows:

Peninsula of Apsheron. Anticline structure was detected by electrical methods of prospecting at several places (Giurgiani-Zyria, Zykh, Kala, and others.

Prikurinsk Region (region along the Kura River). Several anticlines were discovered by electrical and magnetic methods of prospecting.

A series of geophysical exploration works is planned in many other regions. --W. Ayvazoglou.

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(788) ELECTRIC MICROMETER APPLIED TO MEASURING VIBRATION AND STRAIN

Editorial note

The Iron Age, New York, vol. 129, No. 10, 1932, p. 620.

A vibration detector recently developed in the general engineering laboratories of the General Electric Co., Schenectady, is described. Somewhat like the seismograph for recording earthquake tremors, this vibration-detecting device is an application of the electric micrometer. The description of the development of a pressure detector and a strain gage employing the same principle is given also.

Some details of the devices and of their operation are discussed.

Photographs are added.--W. Ayvazoglou.

(789) GEOPHYSICS PAPERS RICH IN THEORY AND PRACTICAL DATA

By Sherwin F. Kelly

Mining and Metallurgy, New York, vol. 13, No. 303, 1932, pp. 118-119.

This is a brief report on articles presented at the sessions devoted to geophysics during the February meeting of the American Institute of Mining and Metallurgical Engineers in New York. Papers concerning various methods of geophysical exploration, as well as those of special interest to oil men are enumerated.--W. Ayvazoglou.

9. NEW BOOKS.

(790) Stutzer, O. Erdöl. Allgemeine Erdölgeologie und Überblick uber die Geologie der Erdölfelder Europas (Petroleum. General petroleum geology and a short account of the geology of European oil fields). Gebrüder Bornträger, Berlin, 1931, 628 pp., 199 figs., price $15; special to A.A.P.G. members $11.25. The book is essentially a compilation of the literature on the subject.--W. Ayvazoglou.

(791) Texas Gulf Coast Oil Scouts Association and South Louisiana Oil Scouts Association. Oil and Sulphur Development in the Texas and Louisiana Gulf Coast Salt Dome Region. Bulletin 1, Houston, 1931, 128 pp., maps, sections, tables. Contains compilation of data on the Gulf Coast.

(792) Woolnough, W. G. Report on tour of inspection of the oil fields of the United States of America and Argentina and oil prospects in Australia. 1931, 119 pp., 36 illus. Department of Home Affairs, Canberra, F. C. T., Australia. Price, 5 s. The book gives a brief account of the American oil geology and exploration

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